1. Problem Description

Trying to put several product boxes into a single delivery box. In this case, size of a delivery box is varying depending on disposing product boxes.

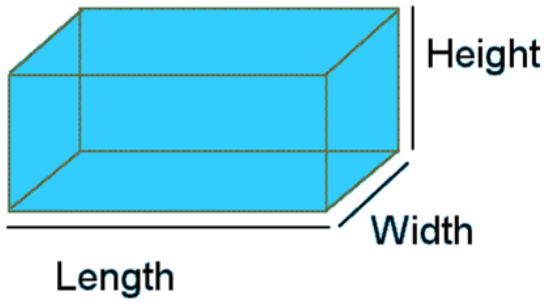
Implement a program to get the smallest delivery box's size which you can put the product boxes in and to find a way of the placement, when the box size for each product is given.

However, we do not consider the height of the product box and we assume that it is not possible to pile the product boxes up. Therefore, we also ignore the height of output.

I/O is from a file.

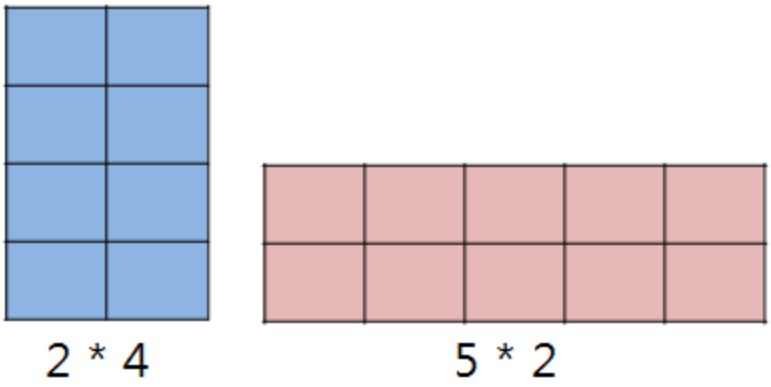
2. Input

The first line of the input file gives the number of product boxes, n ($2 \le n \le 1{,}000$). From the second line, each line has dimensions of each product box, *length* by *width* ($0 < length, width \le 100$).



For example, there is a input file as the following.
2
2 4
5 2

It means that number of product is two and each product's size is 2*4, 5*2.



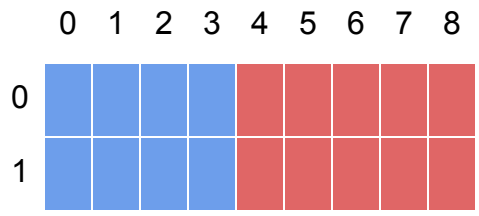
3. Output

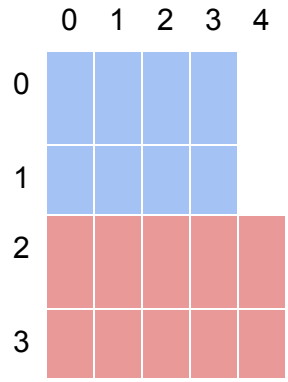
Output file consists of two parts. First, print the smallest delivery box's size (*length* and *width* - *length* always should be greater or equal than *width*). After that, describe how to deploy each product box as same order of input. Each line contains three values where first two values represent the *x*, *y* coordinates for upper-left side of the product box in a delivery box. The third value represents whether the product box is needed to rotated or not. If *1*, we put the box to be rotated 90 degrees. If *0*, we dispose the box as it is.

9 2 0 0 1 4 0 0	5 4 0 0 1 0 2 0

For the previous example, we need the delivery box with dimensions of 5 * 4 and x, y coordinates for upper-left side of first product box is 0 * 0 and second is 0 * 2.

Above output could be depicted as below. 2*4 box is colored blue and 5*2 box is colored red.





c.f.) There could be various results. The smaller (area) size of a delivery box your program finds for a given input, the higher your score will be. Above case, 9*2 output gets higher score than 5*4.